Railways of Australia

NETWORK

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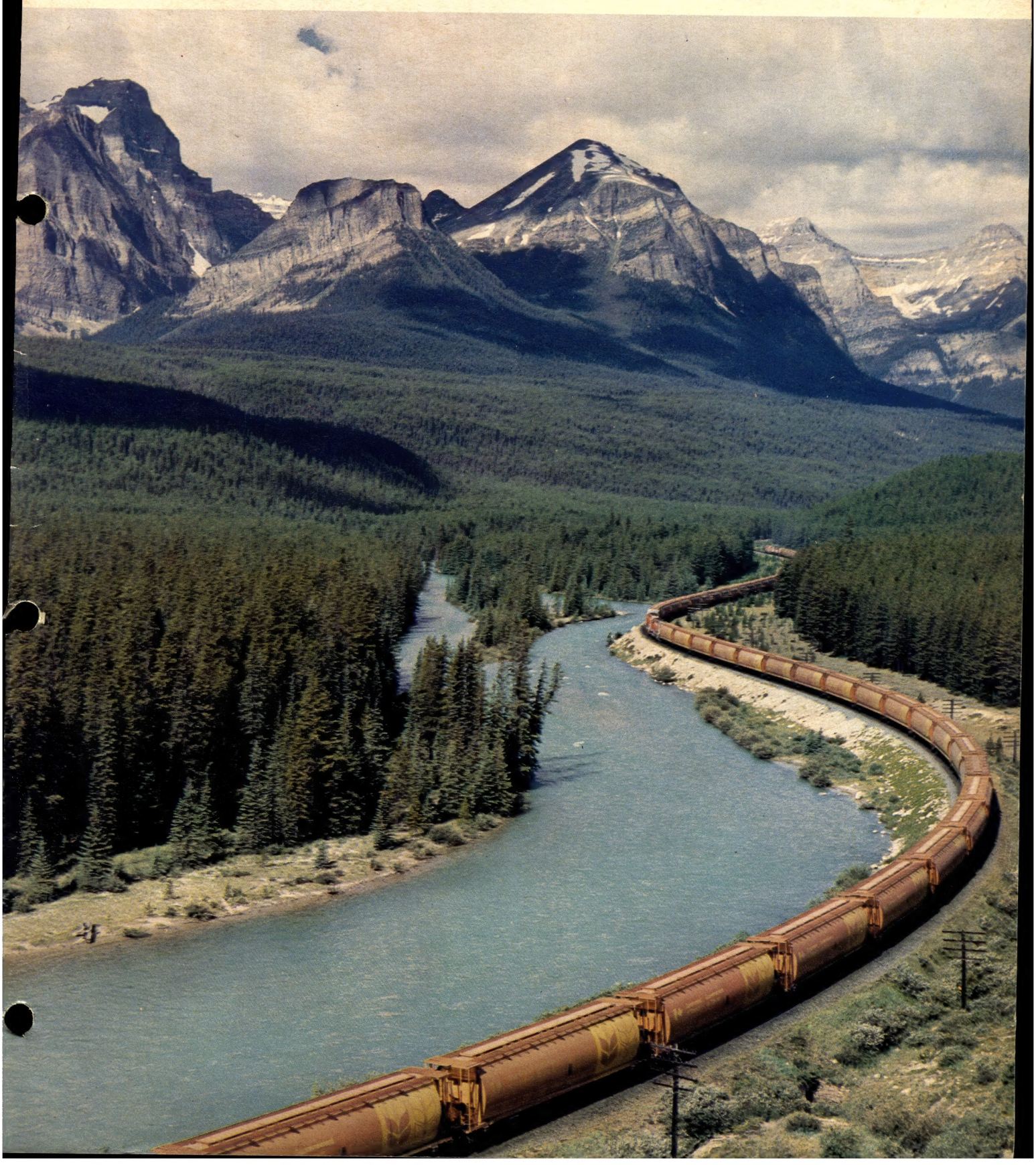

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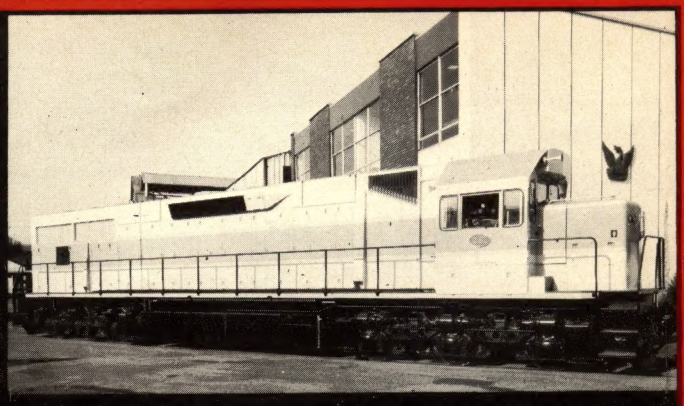

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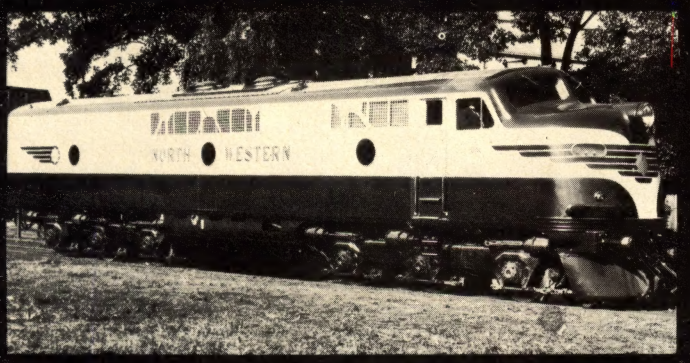

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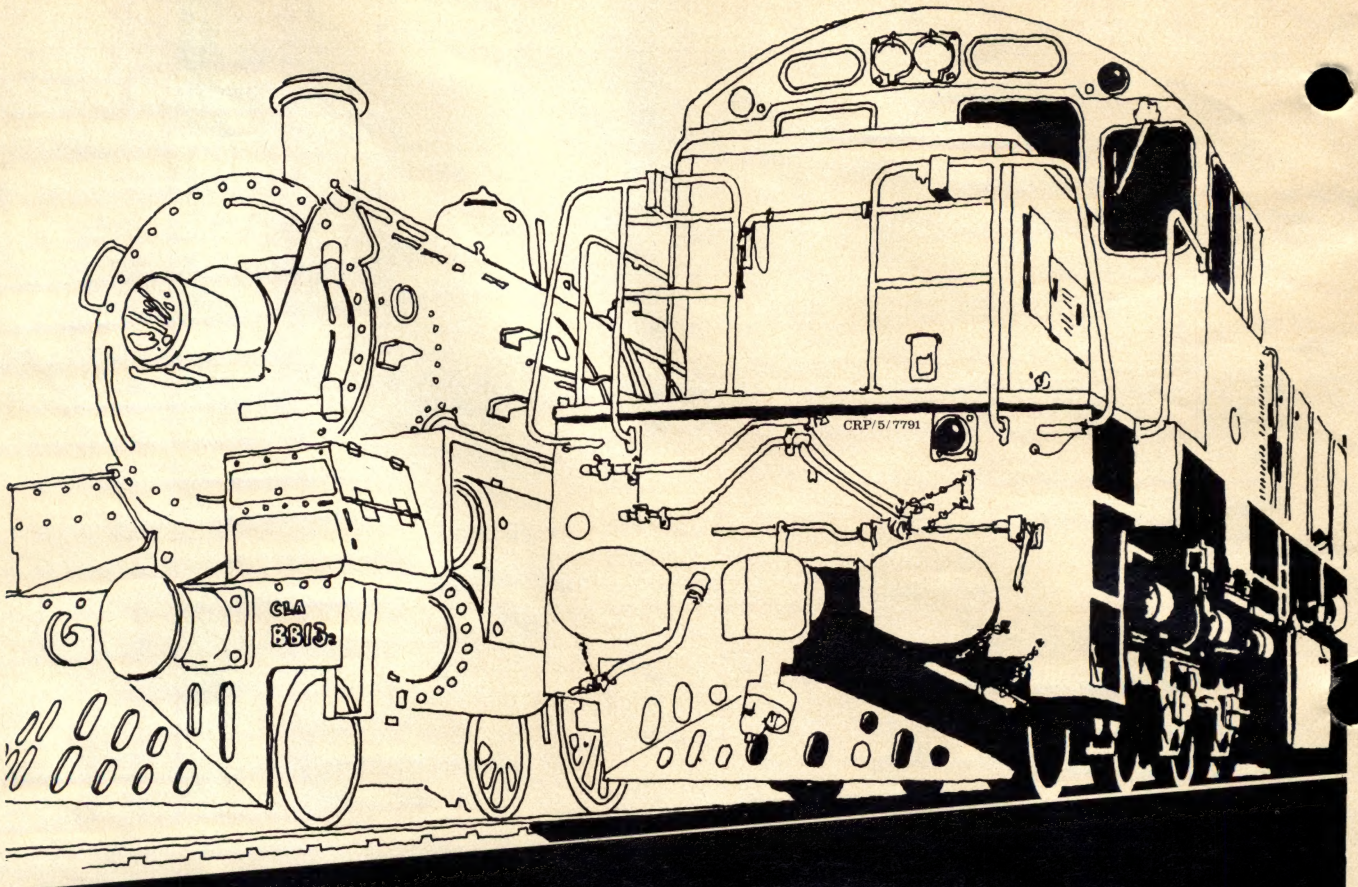

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Railways of Australia NETWORK

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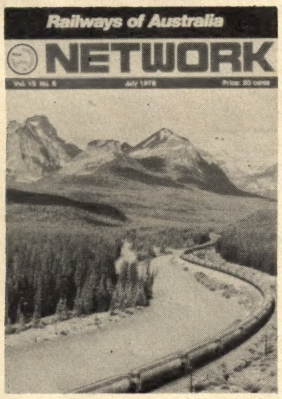

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- Queensland Railways
- Victorian Railways
- Western Australian Government Railways

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OUR COVER

A Canadian Pacific Rail grain train, consisting of government-owned hopper cars, travelling along the Bow River, near Lake Louise, Alberta.

Alyth Yard
from the air (above)
from control tower (below)

Railways of Australia
NETWORK

Transport Planning, Policy and Procedure

Transport affects every person's daily routine, whether it be by private vehicle, public transport or on foot. Irrespective of the mode we use, some thought and planning is necessary by us to organise our personal mobility.

Thought and planning is likewise necessary to provide facilities to enable us to use our private transport. Public transport (which includes bus lines and taxis), roads, traffic management, regulations, codes and standards are vital and essential elements of community service.

We are all aware that there must be some co-ordination of planning, but not all are aware of the hierarchal structure that operates, despite the fact that during our frustrations and personal criticism of transport facilities and related matters we often refer to the mythical "they".

Who *are* "they"? The following identifies the various government areas of policy and planning associated with the above-mentioned public services.

The Australian Transport Advisory Council (ATAC) established by the State and Commonwealth Governments to review, at Ministerial level, various aspects of transport problems and policy including the laws and regulations necessary to safeguard the interests of the State Governments and the users of transport generally.

The complexities arising from the need for integrated transport systems call for extensive consultation and **ATAC**, through its system of policy groups and technical committees, ensures that Transport Ministers are able to formulate policies on sound technical advice.

The role of the Council is, by definition, to act as an advisory body for the Commonwealth and State Governments on transport matters. Consequently, the final responsibility for the implementation of decision rests with individual member Governments.

There are four *ATAC Advisory Committees*, namely the Railway Group, the Road Group, the Motor Transport Group and the Co-ordinating and General Transport Group.

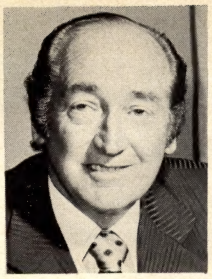
The *Railway Group* comprises the State and Australian National Railways Commissioners and the Secretary of the Commonwealth Department of Transport who advise on railway policy matters. In addition, there is a Railway Group Co-ordinating Committee (RGCC) comprising senior officers of the respective railway systems and the Commonwealth Department of Transport who prepare submissions for Railway Group consideration. Within the railway area there is a Systems Planning and Development Committee (SPDC), consisting of the Railway Officers who are members of the RGCC.

The *Road Group* comprises State Road Commissioners with Commonwealth Government representatives. The Group advises on financing and policy matters concerned with the construction and maintenance of roads.

The *Motor Transport Group* consists of the principal State officials in the motor vehicle safety and regulatory areas and Commonwealth Government representatives, and advises on matters relating to vehicle performance, safety in vehicle design, motor-vehicle emissions, transport of dangerous goods, road-user performance, traffic codes and education on road safety.

The *Co-ordinating and General Transport Group* consists of the principal Ministerial advisers such as the Permanent Heads of the relevant departments. The Group deals with overall issues of policy co-ordination and development as well as topics which do not fall within the terms of reference of the other groups.

In addition, the **Transport Industries Advisory Council (TIAC)** provides a medium for



From the Executive Director's Desk

direct access between the transport industry and the Commonwealth Minister for Transport. The functions of **TIAC** are to provide advice and comment to the Minister on policy issues affecting the transport industry as well as recommendations on how to improve Australia's transport systems. Members are drawn from senior management in the transport industry, transport users, government and semi-government bodies, and unions. They are appointed by the Minister on the basis of their individual expertise in transport matters.

In addition to the above structure many local groups at the grass-roots level are constantly reviewing local transport problems and submitting proposals through municipal and State Government bodies.

Seminars, forums and conferences relating to transport matters are conducted by various bodies from time to time. During May 1978, an Australian Transport Research Forum featuring the theme "Real Solutions to Real Transport Problems" was held in Perth and hosted by the Director General of Transport, Western Australia, where transport problems and solutions, both practical and theoretical, were discussed.

In September next, a Transport Outlook Conference organised by the Commonwealth Bureau of Transport Economics will be held in Canberra, A.C.T., which will be the forum for government and industry to discuss the future of transport in Australia.

Transport is a vital service which attracts interest and comment from every section of the community. Many who are prone to imagine that transport policy and planning decisions are too often taken on a physical basis — emanating from the top of the head, the seat of pants, or gut feelings — may now realise from the foregoing that this is not always the case.

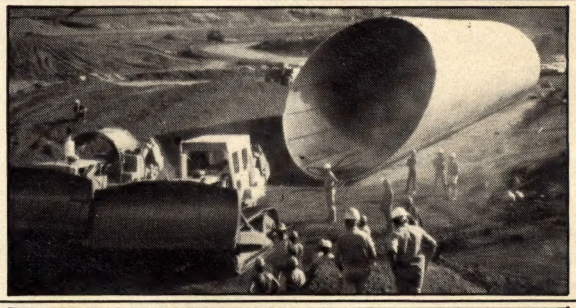
B. M. HOGAN
Executive Director

Armco has the answer.

Q You've made some confident claims about steel in the past and you've always demonstrated proof. But how does steel perform when construction deadlines are tight?

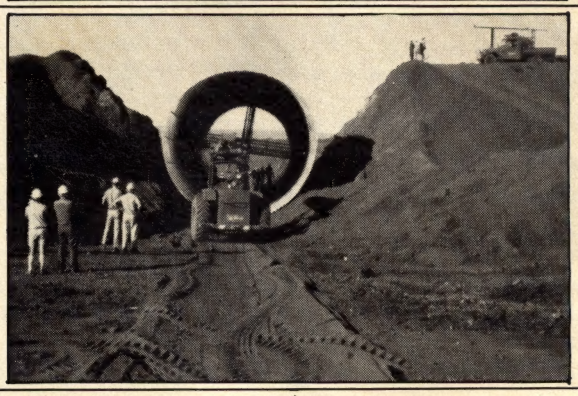
A Because it usually requires only routine assembly procedures, pre-engineered steel actually encourages rapid task completion. You could say this is a natural characteristic of steel.

Q Can you recall one really tight deadline situation, though?



A An extraordinarily tight situation. At Mt Tom Price we were assigned to provide an access road under an existing rail line, where installation of the tunnel, backfill and reinstatement of the line had to be completed within 72 hours.

Q And what was the benefit of Armco steel in this instance?



A Sheer speed of assembly and installation. We completed assembly of the underpass—in line with its proposed final position under the track—two weeks before embankment excavation began. During this period a tow road was prepared, then, with excavation completed, the tunnel was towed into position by two bulldozers (ever tried to tow a concrete tunnel?), the backfill completed and the rail line reinstated.

Q All within 72 hours?

A That's right. The tunnel installation exercise actually took less than 60 hours. We finished in time to see the morning's first ore train cross the new embankment.

Q One other question, though; is the strength of steel ever in doubt in situations like that?

A Armco corrugated steel pipes are designed to deflect the weight of extreme embankments and the weight of the enormous vehicles that pass over them. Apart from supporting the weight of considerable backfill at Mt Tom Price, the Armco structure supports the bulk of massive iron ore trains, week in and week out. That kind of strength can never be in doubt.

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The Public Transport Dilemma

Summary of an Address to the Institution of Production Engineers by ALAN S. REIHER

Public transport is of increasing concern to communities and Governments throughout most of the western world. It is a natural source of comment, and indeed criticism, for politicians and others who seek to influence a modern society. It is also sufficiently complex and sufficiently prone to failure, both in the mechanical and the human sense, to provide a great deal of material for would-be critics.

With this in mind, I shall try to give an overall perspective of the Public Transport Commission contribution to transport in New South Wales, and to point to some of the areas in which there is need for further thought and decision to be made by the community, the Commission and the Government.

Much of the public transport problem of this State has sprung from the lack of adequate public information and debate about many important issues such as standards of facility and service, financial alternatives and their social implications, and indeed the options, where they exist, to the present form and extent of publicly provided transport, both for passengers and for freight.

Financial Contributions

The annual contribution from general revenue to meet the operating cost of public transport in New South Wales amounts to approximately 10 per cent of the total operating expenditure of the State. In terms of capital investment, it represents approximately 16 per cent of the overall annual capital expenditure of the State.

Although the general revenue contribution to the operating of public transport has, in recent years, grown at a significantly lower rate than expenditure in many other areas, it is a major drain on the disposable income of the State, and needs to be decided as much on community grounds and attitudes as on purely business considerations. This is particularly so in respect of passenger traffic, and for some areas of freight service, where for a long period of time substantial subsidies have been made to particular areas of the community for the sake of the community as a whole.

After a long period of under-provision of funds to replace worn out and obsolete equipment and facilities, public transport is now receiving a greater injection of capital funds than at any time since its inception in the 1850s. This is not a rate of outlay which should be expected to continue in the long term; rather, it is an outlay which aims in a relatively short number of years, to put into reasonable order equipment and facilities on which capital investment has been inadequate for many years. Without such major investment, the level of service would have deteriorated rapidly to a totally unacceptable level.

The James N. Kirby Award for 1978

Mr Alan S. Reiher, Chief Commissioner of the Public Transport Commission of New South Wales, has been awarded the James N. Kirby Award for 1978.

The Award is named in honour of the late Sir James Kirby, one of Australia's greatest industrial leaders and a former President of the Australian Council of the Institution of Production Engineers. It is made annually to a person selected by the Australian Council of the Institution of Production Engineers. As well as understanding production engineering, the recipient must be qualified to create interest and promote knowledge and is also required to have achieved eminence, distinction and public recognition in his or her particular sphere of activity. The President of the Australian Council of the Institution of Production Engineers, Mr Sam Downie, said that in making the Award the Institute was conscious of the important and significant part Mr Reiher has played in the national development of Australia in energy resources, transport, higher education and research.

Mr Alan S. Reiher (left) receiving the James N. Kirby Award from Mr S. Downie, President, Australian Council of the Institution of Production Engineers.

The Scale of PTC Operations

Last financial year, the PTC provided approximately 380 million passenger journeys throughout the State. This represents, in the case of the Sydney metropolitan area, approximately 170 passenger journeys per head of population per annum, about one-third higher than Melbourne, and more than twice that of Adelaide.

Of these passenger journeys, all but about three million were made within Sydney and Newcastle and the interurban areas of the Central Coast, Blue Mountains and the South Coast; and of this total, a little less than half were made by train and the remainder by bus. The average metropolitan train journey however, is considerably longer than the average bus journey and, to a substantial degree, these two modes of transport provide for different, though inter-related, passenger requirements. Effective integration of and a unified approach to these services, together with the ferry services and the private buses, is essential for effective, rational and minimum-cost metropolitan public-passenger services.

In 1976/77 the Government-owned bus services provided 187 million passenger journeys and the rail system 183 million journeys. Ferry and hydrofoil services provided approximately 10 million passenger journeys and there were approximately 3.3 million country and interstate passenger journeys.

In addition to its passenger traffic, the rail system carried approximately 34 million tonnes of freight, incurring 26 million train kilometres or about 9⅓ billion tonne kilometres. Almost 90 per cent of this freight was in ten commodities, and over 70 per cent in five commodities — coal, wheat, iron and steel, limestone, and international containers.

The figures given are for 1976/77, and it is of interest to observe some of the trends which have been occurring over recent years.

Over a period of ten years the patronage of the metropolitan bus system of Sydney and Newcastle declined by about 26 per cent, the rail passenger patronage as a whole declined by about 30 per cent and ferry and hydrofoil patronage declined about 24 per cent. So far as rail freight is concerned, there has been a small increase of approximately 4 per cent. Last year, although a difficult year for the economy, saw a rise of 8 per cent in freight tonnage over the previous year due largely to increased coal and wheat traffic.

A very high proportion of the decline in bus and rail passenger patronage occurred in the three to five years prior to 1975/76, but since then there has been a significant change in patronage.

Public Transport Commission passenger fares were reduced by an average of about 20 per cent in June 1976 and concerted efforts were made to market the passenger services and such limited improvements as we were able to make to then. It is now quite clear that the decline in patronage of the previous years has been arrested, and there are indications of significant increases in patronage in at least some parts of the system.

For country passenger services there has been an increase in income compared with 1975/76 of about 9 per cent, and we have had considerable difficulty in providing enough equipment to meet the demands for country services even at periods outside the main peak-holiday seasons.

The longer-term effects of these recent trends in increased patronage will be affected by many factors, not the least of which will be the pattern and extent of future fare changes, the effects of industrial action, and the standards of equipment and service that management is able to achieve.

Maintenance of Equipment

The PTC services are provided by a wide range of equipment, much of which is very old and quite incapable of performing continuous satisfactory service even with very substantial maintenance effort.

If our equipment had been permitted to deteriorate much further it could have reached the point of no practicable return. The deficiencies which led to the Granville tragedy were no more than symptomatic of much of the system and it will be a massive job requiring very large amounts of capital and operating expenditure over a number of years to substantially change the situation.

The principal equipment operated by the PTC includes 2160 passenger rail cars, 1190 of which are for the metropolitan and interurban services. Approximately 420 of these are double-deck cars constructed since 1973. The rail freight fleet consists of approximately 15,600 wagons of various types and about 540 locomotives almost all of which are diesel electric.

A great deal of this equipment, the majority of the facilities on which it is operated, and the workshops in which it is maintained, are very old however, and are far from conducive to efficient reliable service.

More than 520 of the cars in the metropolitan rail fleet are over 35 years old and about 480 are approximately 50 years old. The rate of failure of these older cars is many times higher than that of the relatively new double-deck cars, and each failure in a complex integrated rail system induces between five and ten late train services. There are more than 2000 train services a day in the metropolitan network, and train delays due mainly to equipment failure have been of the order of 1500 or more per month, rising to over 2000 in periods of wet weather. The progressive increase in new metropolitan cars, however, is improving this position.

Train performance in morning peak metropolitan services in Sydney is such that on a normal day 80-85 per cent of trains are on time within five minutes. In the afternoon peak the figure is approximately 10 per cent less, due mainly to the accumulated problems of train performance during the day.

Again, until the introduction of the new Mercedes buses, the failure rate of buses in service had been increasing progressively, from 45 per 100,000 kilometres in 1964 to over 90 per 100,000 kilometres in 1977. This figure is about four times the failure rate of buses in major metropolitan systems elsewhere in the world. The introduction of new buses in the last 12 months and increased maintenance effort is now bringing the position under reasonable control. We now have enough operational buses to conduct all peak services.

In the rail freight area, again, many wagons and locomotives have not been fully maintained over the years. It has been necessary, in order to control derailments, to significantly increase the maintenance of equipment as well as the rail track itself, and to modify rail operations, including the slowing down of trains in many situations.

In the case of locomotives, up to 130 of the 540 units were regularly out of service and although this figure has been reduced by concentrated maintenance effort to 100-110, it is still high and reflects the generally unsatisfactory nature of much of the equipment, and the workshop and depot facilities. The out-of-service level of our locomotive fleet and the rate of failure in service is almost twice the figure of major freight-railway operations overseas.

Capital Charges and Inflation

To remedy the position requires a major investment in capital equipment and facilities. This involves a very substantial financial burden, both to meet the increased maintenance effort required to keep old equipment going, and to meet the increased interest charges for expensive, new equipment required. PTC capital charges are increasing at the rate of about $20 million per annum for new equipment and facilities that should have been provided progressively over a period of many years and charged to the operations of the day.

However, although increasing expenditure in maintenance and capital charges is significant, by far the most important factor in the recent world-wide financial trends of public transport is the effect of high inflation. This is particularly so in an industry which is very highly labour intensive and has to operate almost round the clock to provide its services. In the metropolitan rail system, the direct wages and salaries of the staff involved represent about 70 per cent of the total operating cost. The figure is less for the ferry and hydrofoil services, but in the case of the bus services it exceeds 80 per cent.

Expenditures have increased, and continue to increase, at a much more rapid rate than income, and the rate of increase in expenditure has tended to accelerate beyond the rate of increase in income. For the rail systems of Australia as a whole, in the last four years income has increased by approximately 50 per cent but expenditure has increased by about 100 per cent.

Income and Operating Costs

In 1976/77 the contribution from general revenue required to balance expenditure on metropolitan passenger services in New South Wales amounted to an estimated 44 per cent of the total supplement required to balance overall expenditure; for country and interstate passenger journeys the comparable figure was 22 per cent, and for all freight service it was 34 per cent.

To give a better perspective of this situation, it might be helpful to relate income and expenditure in terms of average passenger journeys.

	Average Passenger Fare	*Subsidy*
For buses	22c	30c
Metropolitan Rail	36c	48c
Country and Interstate Rail	$8.17	$22.45

The recovery of operating cost of our metropolitan services is not greatly different to the average of a large number of modern passenger transit authorities in North America, Canada, Europe and the United Kingdom.

Ten years ago, in 1967/68, the percentage recovery of operating cost through fares and charges in the New South Wales system was approximately 80 per cent, compared with approximately 60 per cent for 1975/76 and 43 per cent in 1976/77.

For some sixty-three overseas passenger undertakings which are members of the International Union of Passenger Transport, the average recovery of operating cost in 1967/68 was approximately 80 per cent, with a steady decline to about 55 per cent in 1975/76.

The collective forecast of these overseas undertakings is that the average recovery of operating cost will decline further over the next five-year period, and at a rate not greatly dissimilar to that of the last ten years. It is expected to be of the order of 30 per cent by the early 1980s.

Comparisons of country and interstate passenger cost recovery are much more difficult to obtain on an international basis; much depends upon political decision in respect of conducting long-distance passenger services as a community service.

With freight services the main bulk traffics of the PTC in a normal year do return an income sufficient to cover all relevant costs and make moderate provision for lean years; and a sizeable part of the train-load and near train-load traffics are border-line in their recovery of costs in a normal year. Less than car-load traffic, and the occasional car load which has to be positioned at some isolated siding, falls very far short of full cost recovery and is the area in which almost all freight traffic losses occur.

Given the trends of expenditure and income in passenger services, and for miscellaneous minor freight traffic, there is no way any administration or Government is going to reverse the trend to the point where these services become profitable in the way in which they are presently accounted. This is not to suggest, however, that in an overall community sense they are uneconomic, still less to suggest that they are undesirable, when compared with the possible alternatives. Not enough work has been done either in Australia or anywhere else in the world, to establish the overall community economics of public transport services.

Community Considerations

In my observation, Governments overseas are tending progressively to separate earnings and expenditure on public passenger transport, on the basis that it is a public service in which the level of earnings and the extent of services provided are determined substantially by community and political considerations, and that the administrations responsible for the conduct of such services should not be placed in the position where their efficiency of performance is affected adversely by public criticism of the losses they incur. It is devastating to the morale and efficiency of an organisation to be continuously criticised for losses which are in no way a measure of its efficiency and which are in any case a product of community decisions. Pricing policy is, of course, a major factor in determining the level of general revenue support which needs to be given to public transport, and in almost all parts of the world this is a matter for Governments to determine in a manner consistent with community acceptance.

British Rail now has a contractural arrangement with the Government whereby its financial performance is judged against the contract of service between it and the Government rather than in respect of its profit or loss. Similar arrangements are evident in other countries, including Canada. Amtrak in the U.S.A. and V.I.A. in Canada are based essentially on the premise that long-distance passenger train services need continuous Government support and should operate on

the basis of commitments between the Government and the organisations for specific financial support for agreed levels and standards of service.

In our own situation, as I said earlier, we are faced with large capital expenditure and increased operating expenditure to restore public transport services to a more satisfactory level; and important decisions have to be taken as to the extent to which renewal or replacement of equipment and facilities should be pursued in the various areas of service in the certain knowledge that the need for support from general revenue will increase very substantially in some areas and possibly not at all in others.

We have a large number of old country passenger rail cars in need of replacement and our rail track conditions, though satisfactory for freight movement and relatively slow passenger traffic could only be upgraded to modern high-speed standards at enormous cost, which would significantly increase the overall loss on such services.

In terms of interstate passenger traffic where distances are great and track conditions are those suitable for moderate speed passenger cars, rail equipment in some areas is approaching the point where replacement will soon be necessary. Again the question arises as to how far the community should invest in substantially improving such services knowing that losses on this traffic will almost certainly increase if this is done.

With miscellaneous general freight, the question again arises as to whether large expenditure should be incurred on wagons, locomotive power, terminals and track to provide a service which, in at least a substantial degree, might well be provided in other ways at significantly less overall cost to the community (although, clearly, there would be individuals and groups in the community which could be adversely affected by such a decision).

The Role and Assessment of Public Transport

These dilemmas require increasing and continued provision of facts to the public, extended debate to clarify sectional and community views and interests, and more work by administrations and by Governments to articulate the alternatives and their pros and cons to a point where there is reasonably wide understanding of the courses of action which could be adopted.

The recently established Australian Rail Research and Development Organisation will contribute significantly to an improved understanding of the proper role of rail services, both passenger and freight, in meeting the surface transportation needs of Australia, n particular outside the major urban networks. In conjunction with the work of the individual public transport systems, the Australian Road Research Board and the Bureau of Transport Economics f the Federal Government, the Universities and others involved in analysis and advice to Governments and communities on the transport task, it should contribute materially to balanced investment and disinvestment in our existing surface transportation systems.

I hope that in the reasonably near future it will be possible to create in Australia a national group of the International Union of Public Transport, to ensure the freest possible exchange of information, both nationally and internationally, on urban transport and to enable all forms of public transport to benefit in a greater degree from the experience of other systems.

In the meantime the major capital investment programme of the Government and the PTC in New South Wales is being directed primarily to those areas where there can be no reasonable doubt as to the operational need and the longer-term requirement for the service. Current investment is not aimed at diverting large numbers of people to public transport at increasing community costs, nor to diverting miscellaneous freight to rail at increasing community cost, but is aimed at restoring essential services to a satisfactory level of performance.

It is aimed at creating a satisfactory overall environment for the haulage of bulk commodities, and at establishing efficient operating and maintenance facilities to enable the essential services required of the Commission to be performed in the most efficient manner possible.

The rail system in particular has a capacity to improve the general community environment, and it is expected that with the investment and other changes taking place in the system, more people will use it and more bulk freight will be carried by it for the particular advantages which it presently has to offer and for the emerging advantages it has in respect of energy conservation and general environment protection.

The public transport system is one of the major activities of the State and of the country, and it is important that it is developed in a manner appropriate to the needs of the community. The PTC exists to provide, in an efficient way, the public transport needs of the State as expressed by the community and as determined by the Government of the day.

The Rail Operations Branch of the Public Transport Commission of N.S.W. has taken delivery of nine new self-propelled cranes of a type only recently introduced to Australia. The cranes, specially designed for yardwork and warehouse duty in tightly confined spaces, were supplied by Coles Cranes Limited, of Revesby.

The new "Hydramobile" 911 has a lifting capacity of 9.15 tonnes through full circle slew and maximum hydraulic lift height in excess of 13 metres. In operation, it is exceptionally compact and manoeuvrable. Short overall length (9.32 m), low overall height (3.20 m) and an extremely tight tailswing mean that the crane can gain access under low-headroom doors and along restricted passageways.

Mr V. J. Graham of the PTC's Way and Works Branch has been appointed Project Manager, Balmain. His responsibility is for the proposed upgrading of the Balmain coal-unloading facilities and for all works associated with the loading terminals on both the Western and Southern lines. In addition he will be responsible for any other engineering or operational requirements of these lines to enable the Balmain and Port Kembla coal loaders to function satisfactorily.

Mr Graham will continue as Project Manager for the Whittingham/Mt Thorley Railway until completion of that project, and will continue to be responsible for any construction or upgrading of facilities or operations for loading coal on trains in the Northern coalfields area.

Concrete Sleepers for the Transcontinental Lines

Prestressed concrete railway sleepers were a technological advance with an impact equal to that of the change from steam to diesel engines, the Chairman of the Australian National Railways Commission, Mr K. A. Smith, said recently. "When we utilise concrete sleepers, the track is virtually maintenance free."

Mr Smith was speaking at a Mile End ceremony at which sleeper manufacturer Readymix Costain Joint Venture and the Australian National Railways presented a section of concrete-sleepered track to the Mile End Railway Museum. The track displayed at the Museum was typical of the most modern railway line laid in Australia.

The ceremony marked the manufacture of more than 500,000 prestressed concrete railway sleepers at the Joint Venture's Port Augusta and Kalgoorlie factories for the ANR, and the announcement by the Manager, Mr G. H. Quinn, of two new contracts for a total of 180,000 sleepers at the two plants.

Prestressed concrete railway sleepers are being used for the construction of the new all-weather 830 km Tarcoola-Alice Springs railway line and for the upgrading of the 1700 km transcontinental line between Kalgoorlie and Port Augusta.

Mr Quinn said that the exhibit contained the first and the 500,000th sleeper made by Readymix Costain for the ANR which had introduced prestressed concrete railway sleepers with continuous welded rail on these rail routes three years ago. This followed an economic evaluation by the Bureau of Transport Economics which determined the cost savings possible from the new system.

Overseas experience and accelerated testing had indicated that the life of prestressed concrete sleepers would be well in excess of fifty years; and the combination of prestressed concrete sleepers and continuous welded rail provided travellers with a more comfortable and a safer ride.

Museum Manager, Mr R. A. Fluck, said it was fitting that G1, the first locomotive built specifically for the Commonwealth Railways in 1914, should be displayed on a section of the most advanced track structure available in Australia today.

Commenting on the project later, Mr Quinn said that Readymix Costain Joint Venture had been set up specifically to manufacture concrete sleepers, and had been awarded its first sleeper contract in 1975. "On completion of its new contracts, the Joint Venture will have produced sufficient standard gauge sleepers for more than 450 km of track.

"The new all-weather Tarcoola-Alice Springs line is now nearing the half-way mark on a route far west of the old narrow-gauge line which has been plagued with washaways resulting from flash flooding in shallow creeks along the line, cutting off Central Australia for many weeks at a time."

* * *

Both the Port Augusta and Kalgoorlie factories have central mixing concrete plants with a one-metre turbine mixer fed from 120 tonne overhead raw-materials storage and an 80 tonne cement silo. Each plant is operated for two hours each day to produce 55 cubic metres of concrete, which is sufficient for 500 sleepers.

The low-slump concrete used in the manufacture of the sleepers has strength requirements of 30 MPa after 16 hours of free and radiant steam curing, and 50 MPa after 28 days' standard curing with a standard deviation of 3.2 MPa.

The design of the sleepers is such that the stresses induced under service conditions are resistant by the concrete, which is initially in a compressed state, for many millions of loading cycles over many years without cracking. For new construction, sleepers are transported to the rail head on special work trains carrying 200 sleepers in layers of 40 on each wagon.

Specialised sleeper-laying gantries straddle the work train, pick up 40 sleepers at a time, carry them forward and lay them in position on the track bed, correctly placed and

The Chairman of the Australian National Railways Commission, Mr K. A. Smith (left), the Manager of the Mile End Railway Museum, Mr R. A. Fluck (centre) and the Manager of the Readymix Costain Joint Venture, Mr G. H. Quinn, discuss the prestressed concrete railway sleeper and the continuous welded rail exhibit.

The sleeper in the foreground was the first to be manufactured by Readymix Costain in 1975; the second one was the 500,000th, made in April 1978.

aligned. Lengths of rail 137 metres long are laid in position, Pandrol clips fitted, and the rail stressed to the length which it will have at the median temperature during its life. It is then thermit welded into continuous lengths which, depending on the requirements for loops and sidings, can be of the order of 60 km.

The continuous welded rail with secure fastening, heavy concrete sleepers, and effective ballast tamping, results in a stable, low-maintenance track with good gauge-holding qualities, and provides the traveller with safe, comfortable and quiet transport.

Pouring the concrete sleeper bed.

Making the Concrete Sleepers

The Port Augusta and Kalgoorlie factories employ a mechanism system using the Long-line method of prestressing.

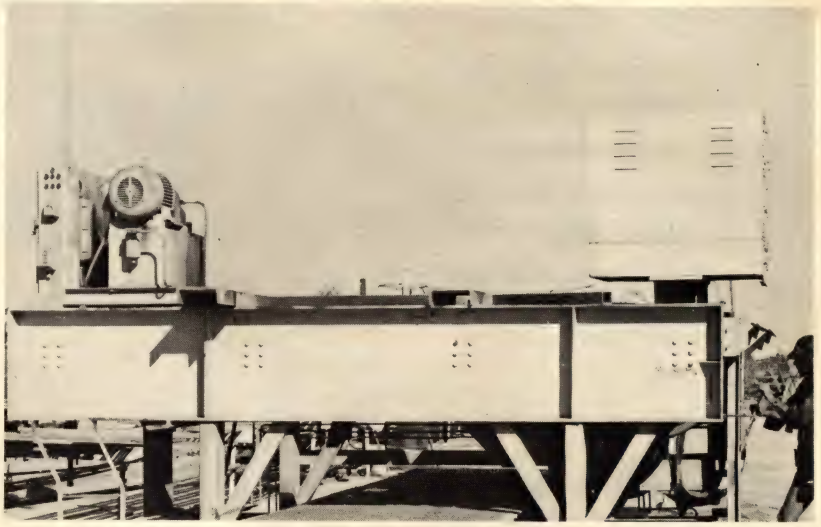
Two beds, each 430 feet long, contain end-to-end composite moulds which take five sleepers each across the width of the bed. The sleepers are cast bottom side up, and provision is made for embedding in them malleable iron shoulder castings which will receive the Pandrol clips to secure the railway line to the sleepers.

Manufacturing commences with the threading, along the length of the bed, ninety 5.08 mm indented prestressing wires which are secured to anchor structures at each end of the bed, one of which is "live". The ninety wires are hydraulically stretched by two jacks in parallel at the live end to produce a force of 23 kn in each wire.

The concrete is placed and vibrated into position on a continuous basis in each of the two stressing beds; and is sampled for compression testing at regular intervals.

After covering the filled moulds with tarpaulins and allowing 1½ hours for concrete presetting, free steam and radiant heat is applied under the covers to achieve an ultimate concrete temperature of 80°C. Approximately 16 hours later, when the concrete strength has reached a level greater than 30 MPa, wire tension is released to apply the total prestressing force over the cross section of the sleeper. The exposed stressing tendons between the five cavity sleeper moulds are severed by a high speed rotary abrasive disc mounted on a carriage which straddles the bed.

Each mould is overturned to remove the sleepers in banks of five which are then stacked by forklift ready for shipment.

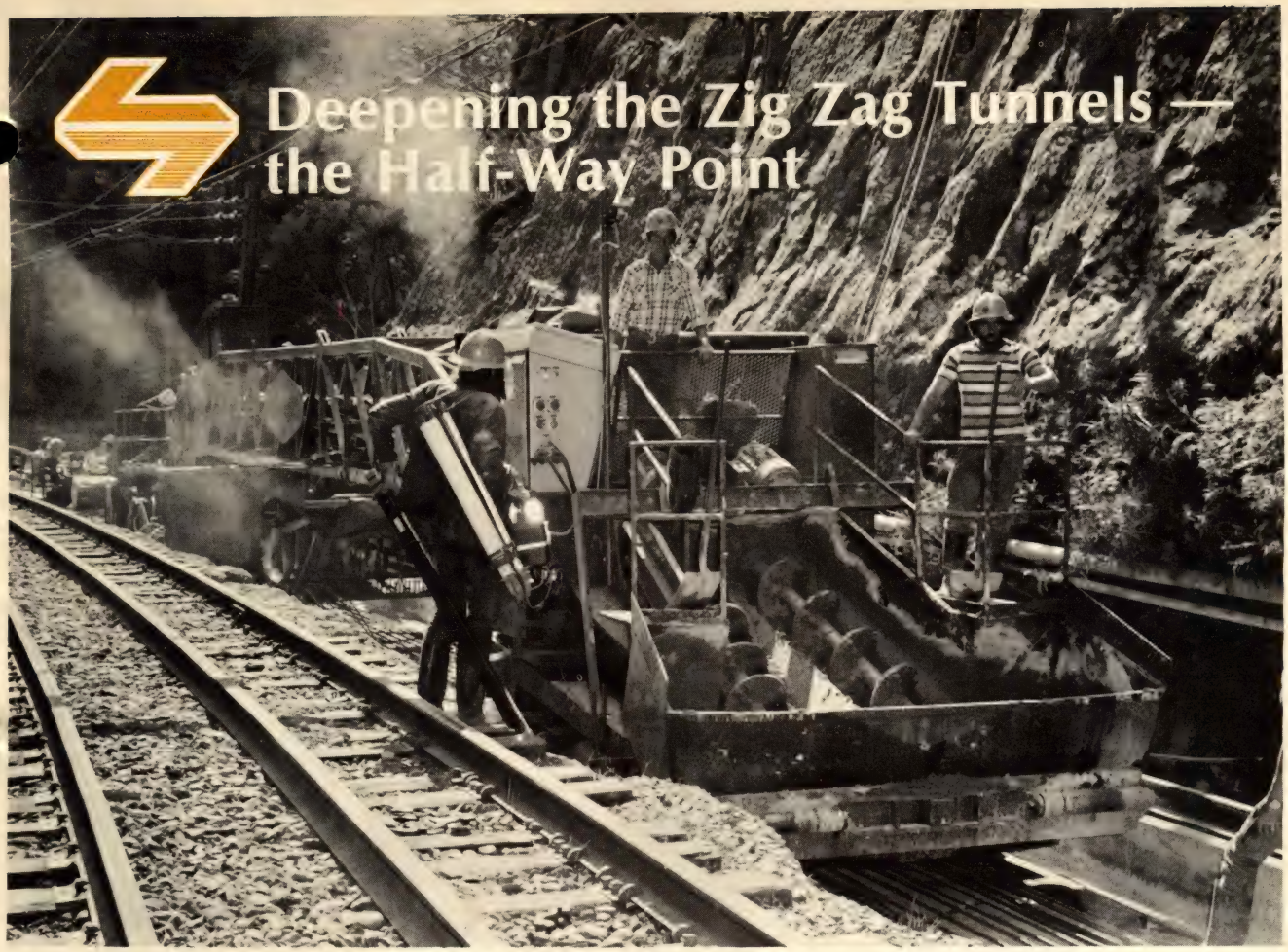


The concrete cutter goes into action.

This Geismer gantry, the first of its kind in Australia, lays 40 concrete sleepers at a time, correctly spaced, on the Tarcoola-Alice Springs railway.

As soon as the sleepers are removed from the bed the forms are cleaned, oiled, and prepared for further production.

Deepening the Zig Zag Tunnels — the Half-Way Point



The 19-tonne "tug" unit hauling the slip-form paving machine.

Working around the clock seven days a week, men and machinery are reconstructing the floor and deepening the ten Zig Zag tunnels, in the Blue Mountains of New South Wales.

The work, which began late last year, is scheduled to be completed at the end of November 1978, and involves the use of mining and concrete slip-form paving machinery, the latter new to Australia.

It is a major undertaking, costing $6.5 million, and forms part of the Public Transport Commission's five-year $200 million rail-track upgrading programme.

The Zig Zag Tunnels were built between 1908 and 1910 to replace the Great Zig Zag, built nearby between 1866 and 1869 to provide rail access from the Blue Mountains escarpment to the Lithgow Valley.

The Great Zig Zag was regarded at the time of its construction, and for many years after, as one of the wonders of the world. Its fame became world-wide and many overseas visitors came to view it.

It was built under the direction of the then Engineer-in-Chief, John Whitton, who held the office of Engineer-in-Chief for more than thirty years (1857-1889) and has been called "the Father of the NSW Railways". He was responsible for the construction of over 3200 kilometres (2000 miles) of railways, the foundation of the present extensive State-wide system.

The building of a series of ten tunnels to replace the Great Zig Zag was also a civil engineering feat, carried out at a time when today's speedy and effort-saving mechanised equipment was not available.

Over the seventy years since the tunnels were hewn out of the Narrabeen Group sandstone, seepage and drainage difficulties have caused the tunnel floors to deteriorate, creating major maintenance problems along the five km of track covered by the tunnel system.

These will now be overcome. The deepening of the tunnels will also permit the use as far as Lithgow of new double-deck air-conditioned passenger trains which, at present, terminate at Mt Victoria.

Consultants

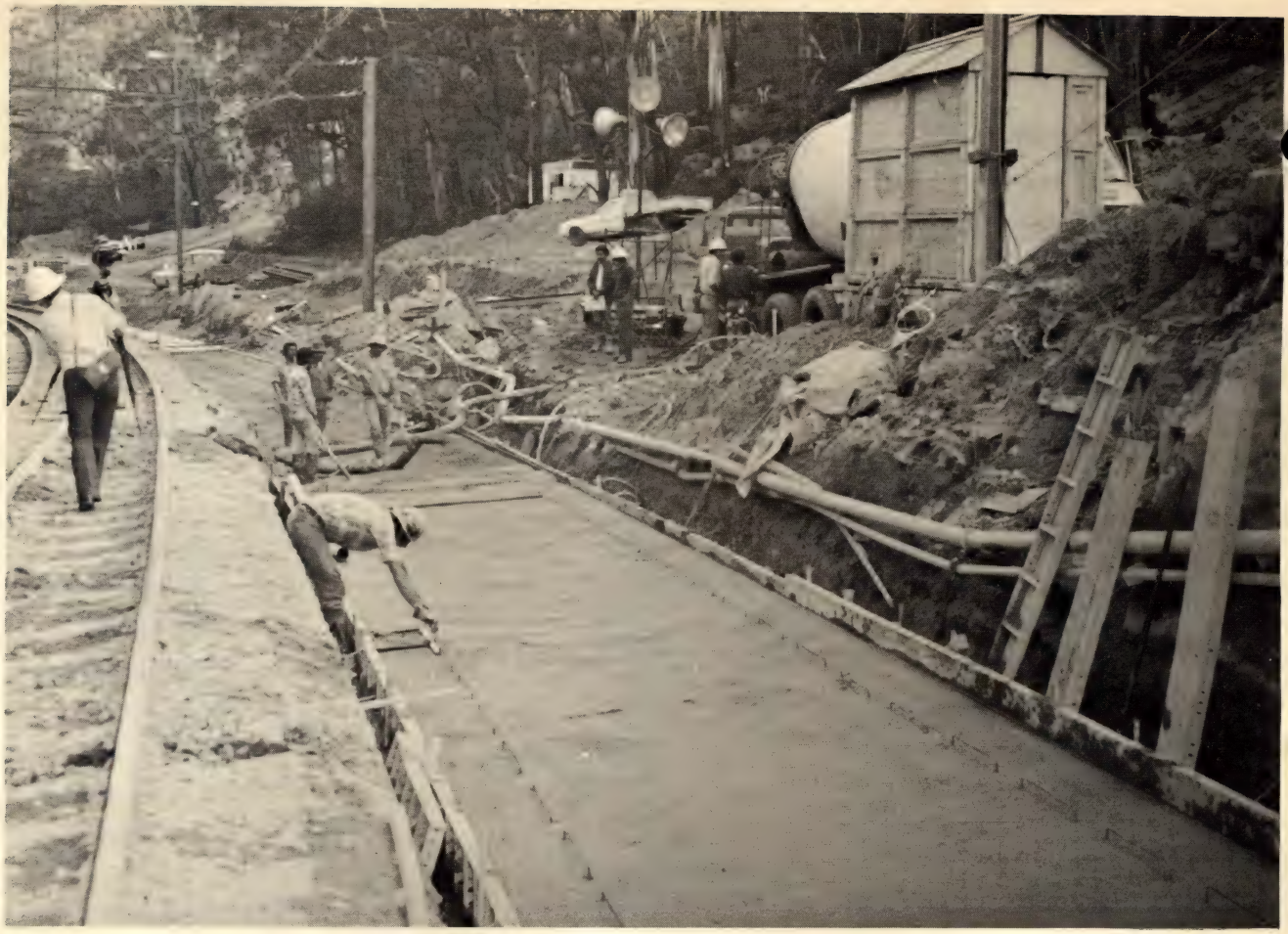
This complex undertaking, with a labour force of up to 250, is being controlled from a site office in the bushland near Edgecombe, between Bell and Lithgow. Consultant and project manager is Transmark, the consultancy subsidiary of British Rail, which has six of its engineers engaged on this operation, assisted where possible by PTC engineers and staff.

Principal contractor, Roberts Construction Co. Ltd of Sydney, is removing the old track, excavating existing ballast and rock, carrying out new drainage work, placing the base concrete and strengthening the tunnel walls by rockbolting. The specialist sub-contractor engaged in placing the paved concrete slab on which the rails are laid is a British firm, McGregor (Paving) Ltd.

New access roads have been built into the area and old ones improved to move men and materials to site. Two concrete batching plants have been constructed, one between tunnels 1 and 2 and the other between tunnels 9 and 10, to supply the 16,000 cubic metres of concrete required for this massive project.

Temporary Service Alterations

The work timetable involves the



Concrete base being poured for the new track.

closure, in turn, of one of the two tracks, and "single line" running becomes necessary for the heavy passenger and freight traffic using the Western Line.

Through passenger services beyond Lithgow such as the "Indian-Pacific", the "Central West Express" and the Dubbo and Mudgee Mails, are not affected, but passenger services commencing from and terminating at Lithgow have been suspended during the tunnel work and passengers are being carried between Lithgow and Mt Victoria by bus.

Some freight services to Sydney, Newcastle and Wollongong from Western NSW have been re-routed, via the Northern Line through Dubbo and Werris Creek, and via the Southern Line through Parkes and Cootamundra.

Work Stages

The upgrading is being carried out in two stages. Initially, the Up main line was closed between Zig Zag and Newnes Junction and all trains between these points travelled in both directions on the Down main line.

When work on the Up line was completed on Sunday, 11 June, the second stage began. This meant the closure of the Down main line between Zig Zag and Edgecombe.

A new signal box was built at Zig Zag and the old signal box at Newnes Junction was re-opened during the first stage of the closure to ensure safe working of trains and, as an added safety measure, sophisticated automatic signalling equipment was installed in the tunnels during the first stage of the work.

The PTC's Rail Operations Branch also conducted a special training programme for its officers engaged in safety duties and operating the "single line" running.

As a preliminary step in the project, over 1,000 fluorescent lights were installed through the tunnels to provide safe working conditions around the clock.

Project work follows a sequence. The first stage is the removal of the old track, using traditional methods. Then earth-moving equipment is used to remove old ballast, loose excavation material and soft rock-formation layers.

The next stage is the removal of the sound hard-rock base of the tunnel and this is done by an "Alpine Miner". The machine, guided by a laser beam, cuts and removes the rock base to a pre-set depth, 1100 mm below the existing rail level.

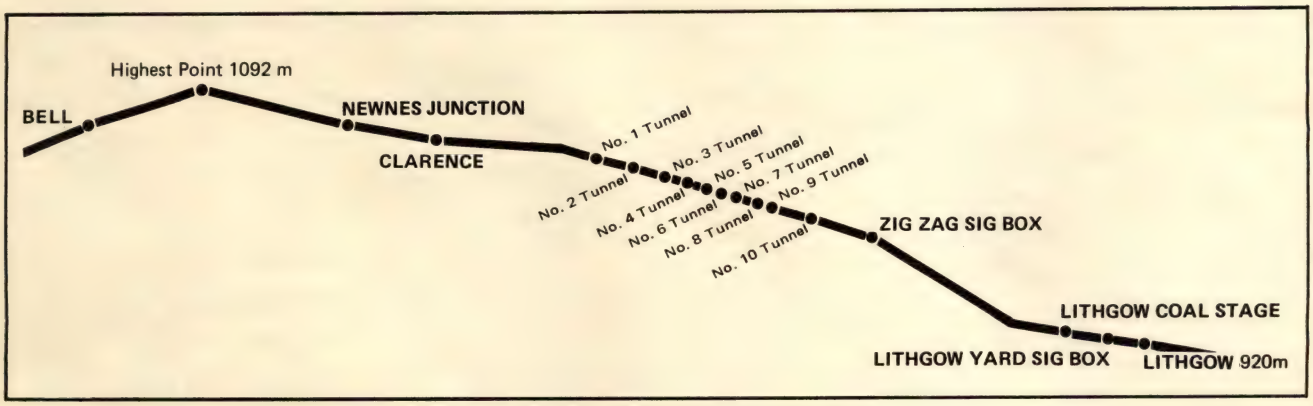
At this stage a thorough geotechnical investigation of the tunnel is carried out by PTC staff. The purpose is to assess potential problem areas and recommend action to ensure good foundation conditions for the fifty-year life of the concrete slab track.

The new track foundation is then laid on the tunnel floor. This concrete base, 150 mm deep, is poured conventionally in 100 m sections of formwork. The concrete is transported in agitator trucks from the site batching plants to near the pour site and then pumped to its final position in the tunnels.

The next step is the construction of a continuous slab of concrete which forms the actual rail bed and is known as PACT (Paved Concrete Track). Paved Concrete Track was developed by British Rail in conjunction with McGregor (Paving) Ltd and has been in use now, on several sites, for up to eight years carrying 25-tonne axle loads and speeds of 145 kph.

It is formed by the use of an imported McGregor Slip-form Paver, which operates on continuous

The slip-form paver moving along the guide rails, pouring and forming the concrete slab. These guide rails form the final track.



Route of the main Western Line showing the ten Zig Zag tunnels.

welded rails, supplied by the PTC, which are ultimately to be used in the tracks of the upgraded tunnels. It moves on steel wheels along the guide rails, pouring and forming the concrete slab as it proceeds. Concrete, already batched outside the tunnel, is conveyed to the machine in diesel-driven dumpers in much the same way as material for a hot-mix road-surface paving machine.

It is then poured and formed into a concrete sleeper-like shape by the machine as it moves slowly through the tunnel, towed by a 19 tonne tug unit which was also imported from Britain for the project.The quality of the concrete going into the paving machine is critical — it has to be just right. The concrete mix is extremely dry, with a slump of between 15 mm and 30 mm, and it must be at the correct plasticity as it emerges from the paving machine and is formed by the steel conforming plate.

The "Pandrol" clips for the rail fastenings are placed in housings which have been epoxy grouted into the concrete, and the continuous welded rail is then fixed in place, sitting on a continuous rubber pad to reduce noise and vibration.

Cost-benefit Assessments

From a cost-benefit point of view, experience overseas has shown that the greatest benefits of using paved track are in tunnels with poor drainage conditions — and, as this is the case with the Zig Zag tunnels, the benefits are quite considerable.

In the past, maintenance work on the tracks through the tunnels has been difficult (because of limited access) and costly, both in terms of labour and in reduced running speeds on this important rail link.

On completion of the work, the track through the tunnels will be virtually maintenance-free, thus achieving major savings in maintenance and the elimination of time-consuming speed restrictions.

The slab laying machine forming the PACT is being used for the first time in Australia on the Zig Zag tunnels. It has already been used many times in the United Kingdom and has also been utilised in Spain and on New Zealand's longest tunnel, of 8.9 km, at Kaimai, which is soon to be completed.

Progress on this big PTC project is on schedule, and when completed in November, will give passenger and freight trains uninterrupted transit on this vital link serving western New South Wales and interstate to South Australia and Western Australia.

EM 80
TRACK EVALUA

High speed track evaluation under actual rolling stock axle loads.

Already chosen in Australia by:
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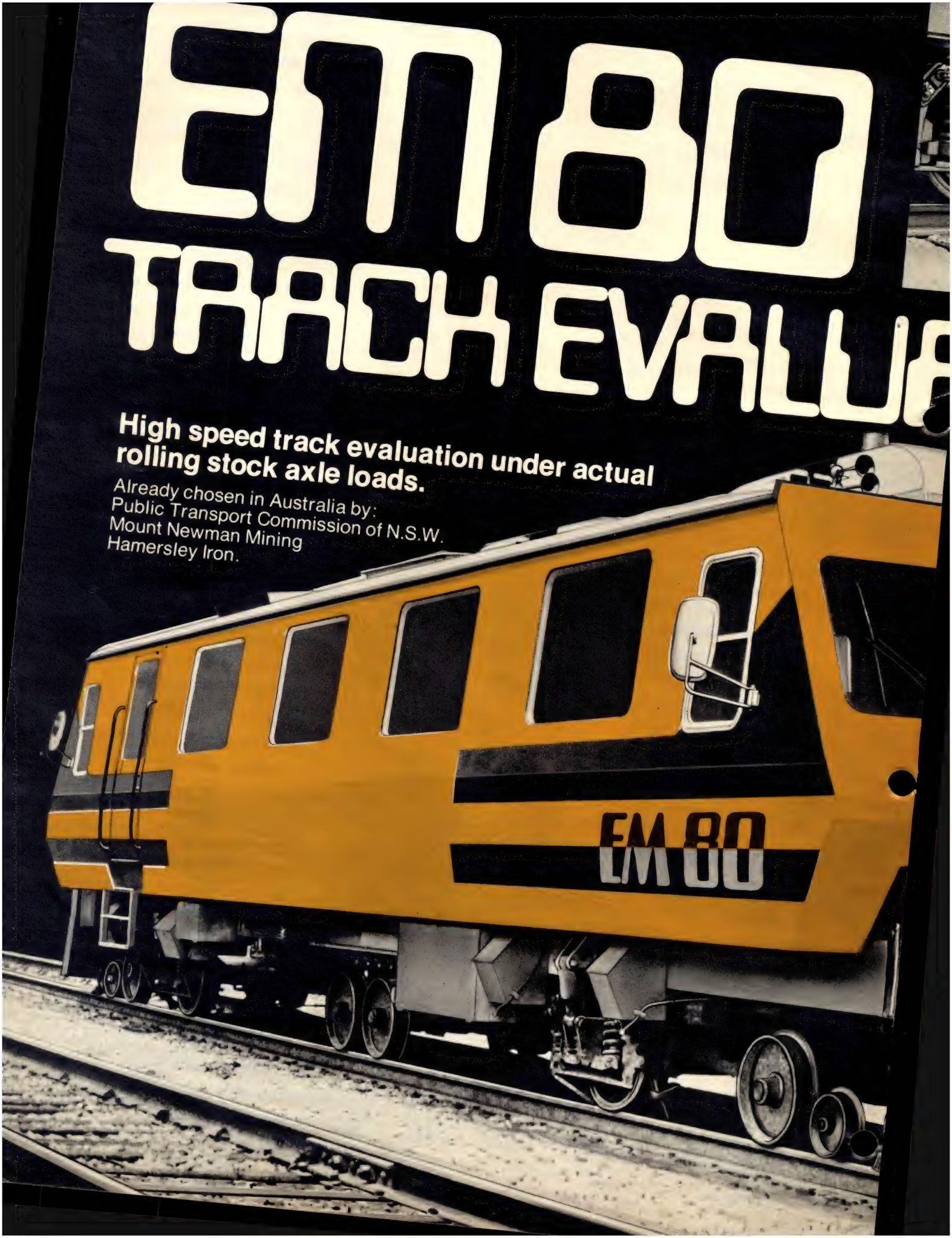

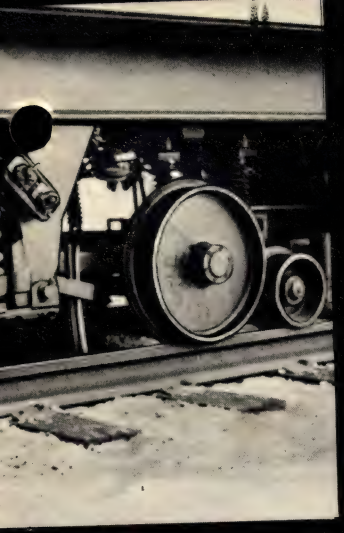

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More Tracks on PTC's Main Western Line

Modern machinery speeds up the laying of new tracks.

Work is well under way on the massive task of duplicating the existing two-track railway between Granville and Penrith. High priority is being given to this task, which will bring major benefits to users of rail services in Sydney's outer western region and the Blue Mountains, including a significant reduction in travelling times.

The four-track line will be all-electric. Work includes elimination of level crossings, new earthworks and bridges, and major alterations to some stations and to signalling and electrical installations. Concrete sleepers are being used in part of the project for evaluation purposes.

The additional lines will permit much greater flexibility in rail operations and allow the running of more frequent express services to and from the outer western area and the Blue Mountains in peak periods. Running times between Sydney and Penrith will be reduced by an average of 8 per cent when the line is completed.

Stages One to Three cover 16 kilometres between Seven Hills and St Marys, and this work requires extensive planning and co-ordination. For example, no less than 110 sewer and gas mains, Telecom and electrical lines and stormwater channels beneath the tracks have to be re-located or modified, with the least possible inconvenience to users of these services.

Stage One comprises the duplication of the existing two-track section between Rooty Hill and St Marys. The two new lines were completed and put into service at the end of May, and the existing two lines are to be upgraded as part of our $200 million track improvement programme. This work will be completed by the end of November, when all four tracks will be put into service.

Another important aspect of Stage One is a new concrete bridge over Rope's Creek which will replace an old steel-truss structure.

Stage Two is the section from Seven Hills to Blacktown and here, too, work is well advanced. The new tracks from Seven Hills to the Sydney side of Blacktown should be completed by next September, and the entire stage is scheduled for completion by February 1979.

This stage involves extensive earthworks, and major alterations to the yard and station at Blacktown. These include a new "Down" main platform, demolition of the existing parcels office and the building of a new one between the Main West and Richmond lines adjacent to the existing car park.

Stage Three of the project is the Blacktown-Rooty Hill segment and this work is also well advanced. The scheduled completion date is January 1980.

The major work on this segment, the reconstruction of the existing viaduct over Eastern Creek, began in May 1977, and the spans carrying the two outer tracks are due to be completed next August. Extensive work is also being carried out at Doonside, including elimination of a level crossing.

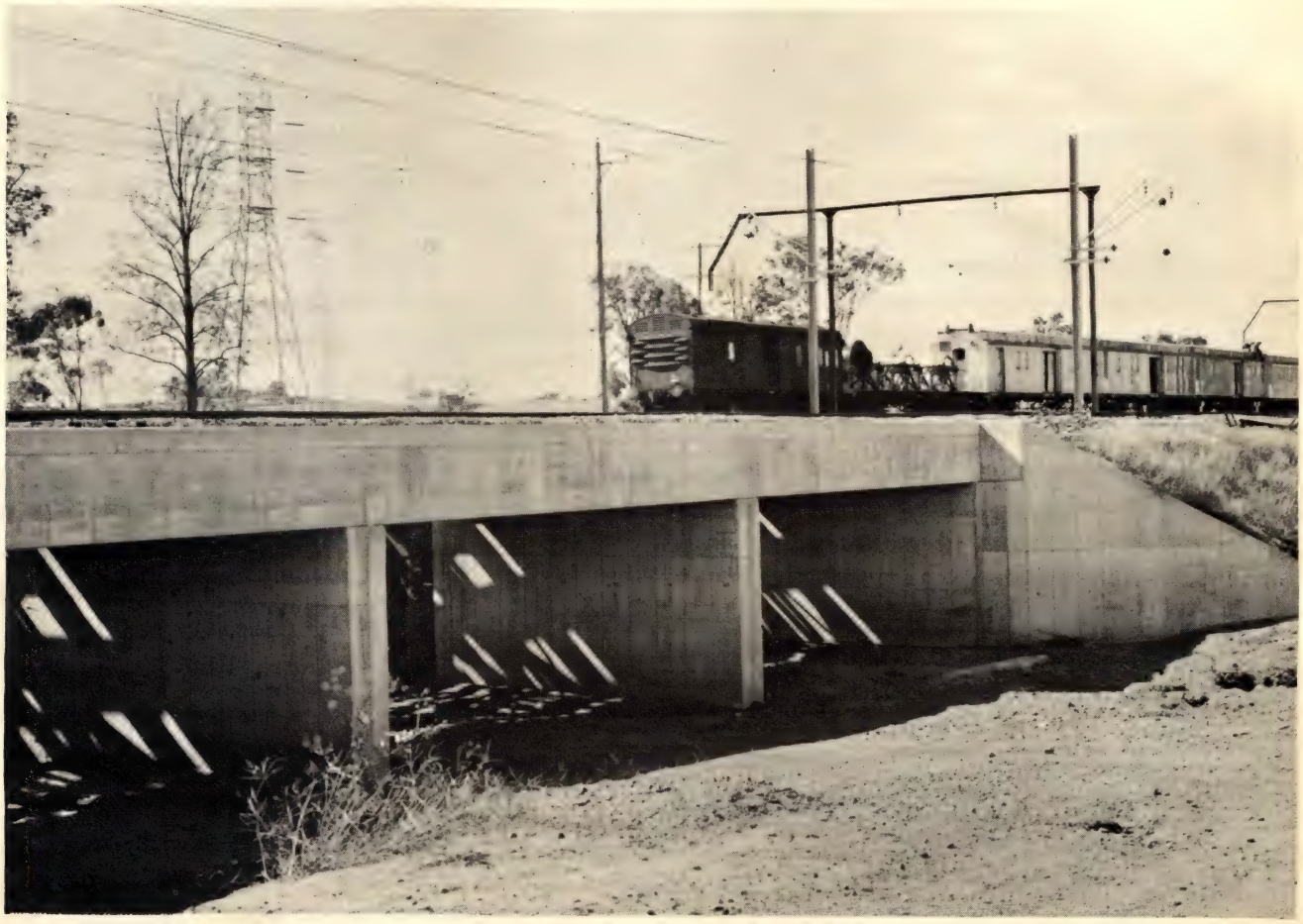
Stage Four of the project, Granville-Westmead, will be started at the beginning of the 1979/80 financial year. Remodelling of Parramatta and Harris Park stations will be included in this work.

Some work has also been carried out between St Marys and Penrith which will form the final phase of this massive project. This work, representing earthworks and similar basic tasks, was undertaken using the heavy specialised equipment hired for use on other stages of the work and represents some 15 per cent of the total earthworks construction on this stage.

Planned expenditure on the Granville-Penrith quadruplication project up to the end of the current financial year is $8.3 million.

The Australian Government, under the Urban Public Transport Improvement Programme, its aid scheme for urban transport, is financing approximately two-thirds of this cost, the remainder being met by the New South Wales Government.

Concrete sleepers are being used in sections of the new track (above) for evaluation purposes. A work train crosses one of the new bridges (below).



CP Rail Links Continents and Oceans

Since its beginning nearly a century ago, the "Canadian Pacific Railway" has changed its name and its meaning to most shippers. Today it is CP Rail, one of the most vigorous members of a world-wide family of transportation and resource operations bearing the Canadian Pacific name.

Canadian Pacific Limited is a global enterprise with interests that range from oil exploration and telecommunications to hotels, pipelines, shipping, and an international airline. The rail system remains, however, the bedrock of the corporation's activity. It serves all provinces in Canada except Prince Edward Island and Newfoundland, both off the Atlantic coast; it links most key cities in the country; and it connects with major U.S. railroads.

With the accent on freight service, CP Rail offers swift links between Canada and the U.S. Midwest through its subsidiary, the Soo Line. It also connects with the major Canadian ports such as Vancouver, Roberts Bank, Thunder Bay, Montreal, Quebec City, Trois-Rivieres, Saint John and Toronto. The system is sufficiently flexible to handle all types of cargo and to switch payloads smoothly between ocean vessels, rail and trucks.

CP Rail is a big railway, with approximately 1300 locomotives and 73,000 freight cars. Most important to shippers, it is a world leader in inter-modal services and containerization.

Principal commodities carried are wheat and grains, coal, potash, sulphur, copper and nickel ores, sand and stone, piggyback and container traffic, forest products, liquid petroleum gas, gypsum, iron ore, oil, gas, chemicals, and phosphate rock. Wheat and grain products represent approximately 25 per cent of all traffic handled, but they contribute only about 10 per cent of total revenues. Piggyback and container traffic, on the other hand, contribute more revenue per ton than most other traffic.

CP Rail was a leader in the introduction of unit train systems. One such system carries coal from the interior of British Columbia to the Roberts Bank bulk-handling port facilities, near Vancouver, for export to Japan. Such trains are hardly ever uncoupled, are on the move almost continuously, and carry more than 9,000,000 tons of coal a year. They are the closest thing on rail to a pipeline, and their efficiency enables Canadian coal to compete effectively in world markets.

At Saint John, New Brunswick, the decision of a Japanese container shipping consortium to move all traffic through that harbour's container terminal, Brunterm, which is jointly owned by McLean Keedy Ltd, a Montreal steamship agency, and CP Rail, has made it Canada's principal eastern gateway to the Pacific.

Containers move directly from the ship to waiting rail cars without a storage interval on the dock, while container trains operating on fast schedules co-ordinated with ship arrivals carry them to CP Rail's network of 14 major inland container terminals. From these centres, traffic moves to its final destination by truck — and Canadian Pacific operates the country's largest truck fleet.

This inland terminal system, which helps speed movement of containers to surrounding markets, includes the Schiller Park container terminal at Chicago, operated by the Soo Line to serve the U.S. industrial heartland. The same intermodalism applies in reverse when CP trucks pick up containers, which are placed on railway flatcars, taken to port and moved to their overseas destinations by special container vessels.

* * *

Centralised monitoring of the CP Rail system goes on 24 hours a day at the system's operations centre in Montreal. From there the location and movements of hundreds of trains are synchronized and represented on a huge systems board. This ensures co-ordination of traffic and efficient planning.

CP Rail has two basic types of signal systems. In rail corridors with high volumes of traffic, centralized traffic control (CTC) is used. With this system, the train dispatcher sits at a control panel on which are displayed in schematic form all trains and track in his operating zone. Lights on the panel show the progress of all trains at all times. The panel also displays other equipment items, necessary in the functioning of the railway, which the dispatcher is able to control from his panel. These include switches, signals, snow melting devices, and snow-slide fences.

In other zones, regular automatic block signals (ABS) are employed to keep the trains moving. In these areas, the signals function automatically, but the switches are operated by train and yard crews. Communications between the operating points and trains are usually by two-way radio.

CP Rail was the first in Canada to provide shippers with daily reports of freight movements. As a freight car moves along a section of track, an automatic scanning device reads and transmits its number and location over high-speed microwave circuits. Reports on the car are then issued automatically from a centralized computer. Up to 100,000 movements of rail cars on CP Rail's freight system can be processed in a day.

In two of the railway's largest yard complexes, the Agincourt Yard in Toronto and the Alyth Yard in Calgary, both the switches and the speed of cars moving over the hump are computer-controlled.

* * *

Montreal, Winnipeg and Calgary are the sites of CP Rail's main heavy locomotive and car repair shops, and the Winnipeg shops also manufacture switch components and car wheels. The railway also operates a network of light repair shops to handle such functions as wheel changes, and gear and coupler replacements. CP Rail spends approximately $195 million annually on repairing and maintaining equipment.

At Montreal's St-Luc Yard, CP Rail has recently installed North America's first cracked-wheel detector. This device, by way of ultra high-frequency sound, spots cracked wheels on moving cars as they enter the receiving yard area.

Lachine terminal, Montreal, with a capacity of 150,000 teu's and 156,000 trailers per year.

Brunterm, Saint John, serves ten container steamship lines, and has a potential capacity in excess of 200,000 teu's a year.

In addition, the railway spends approximately $140 million annually on repairing and maintaining the railway line. Its fleet of 3800 pieces of work and service equipment is always busy, and each year over 500 miles of track are replaced, often with continuous welded rail. Sometimes referred to as "clickless rail" or "ribbon" rail, it is usually ¼ mile or 40 car lengths long and causes less wear and tear on equipment. Temperature conditions are very crucial when continuous welded rail is set down into the railbed. If it is too hot or cold, the rail doesn't fit properly — which could be disastrous. If the temperature is too cold, a special machine heats the rail while it is laid down. CP Rail has already laid around 1600 miles of welded rail throughout Canada.

In addition to repairing or replacing track, the railway also works continuously at maintaining ballast, and replaces an average of more than 1.3 million ties annually.

In the early 1970s, CP Rail conducted experiments in railway electrification in Europe as well as in a mountainous region of British Columbia which has extreme winter-weather conditions. It was found that conversion to an electrified line and electric locomotives is technically and economically feasible. This is because electric locomotives are more powerful and have better traction per unit than diesel-electric locomotives. In addition, the cost of electric energy is expected to be lower over time than the cost of diesel-oil and electricity is a more flexible source of energy, coming from hydro, thermal or nuclear generators. However, the initial conversion to electricity is extremely expensive. Before any such conversion could be seriously contemplated railway economics would have to improve.

Another CP Rail experiment has been in the use of solar energy in railway operations. In December 1975, a solar power unit, which converts the sun's rays into electricity, was installed at a railway-highway crossing near Joliette, Quebec. The electricity thus produced recharges the batteries that power the track circuits and the highway-crossing warning signals.

CP Rail also installed a solar generator to power a radio repeater at Silver Creek, on Mount Cotterell, B.C. in January 1977. The repeater receives and transmits frequencies from mobile radio operators along the railway line. In the past, the repeater was powered by a diesel engine generator, located at the base of the mountain, which was frequently unserviceable because of extreme weather conditions. The solar unit, mounted on 25-foot high stilts next to the base station which houses the radio repeater, needs no servicing. The purpose of these experiments is to see whether solar units can reliably and economically replace conventional diesel generators.

* * *

CP Rail has a world-wide network of sales offices to provide answers to any questions about how goods are transported to and within North America — and how CP Rail can link the prospective exporter or importer with any point in Canada and many destinations in the U.S.A.

CP Rail's Australian representative is R. V. Sablin & Co., 500 Collins Street, Melbourne 3000.

A Second Century for "Old 1919"

After a century on the New South Wales Government Railways system, "Old 1919" has taken up "traffic stopper" duties at the Lachlan Vintage Village tourist project at Forbes.

One of a collection of standard-gauge steam locomotives acquired by the Forbes tourist project from the N.S.W Railways, "Old 1919" now sits on a length of line specifically constructed in her exhibition area, resplendent in new livery designed to preserve her into her second century.

It was originally intended that these locomotives would haul special tourists trains to establish the link between the Central Western region and the historic site, which portrays life in a goldfields community of a century ago. However, dramatic changes in the economy have prevented this, although considerable restoration work has been undertaken on all locomotives in the Village's collection, some excursions have been run, and the Lachlan Valley Steam Railway Society is now caring for a substantial part of the Village's rolling-stock on the little-used Eugowra line.

Forbes Rotary Club masterminded the 20 miles movement of "Old 1919" from the Parkes locomotive depot to the Lachlan Vintage Village site, on the Newell Highway, on the outskirts of Forbes.

Funds raised some years earlier by public subscription were used to assist the move, with Rotary and the Vintage Village organising the exhibition section of line to await the locomotive's arrival.

The Railways breakdown crane at Parkes lifted the 25-ton locomotive from the railway line to a special road transporter for the road movement. At Forbes, Railway staff again provided the professional supervision when "Old 1919" was jacked back on to the tracks. Steam cleaners were then used to begin the task of de-griming the locomotive ready for painting.

Historically, "Old 1919" is the most important locomotive in the Vintage Village collection. Built in 1877 by Beyer Peacock, England, she has the unusual feature of cylinders between the frames, being best suited to shunting or light hilly branch lines restricted to 25 mph.

Others in the "fleet" include "Rosie", a locomotive which finished her working days as a shunter at Parkes, was consigned to Sydney for scrap, was saved and

Ralf, of narrow-gauge fame.

faithfully restored at Enfield and then, on her return to Parkes, hauled a vintage train to carry the then Prime Minister Mr E.G. Whitlam.

Mr Whitlam drove "Rosie" for part of the journey between Parkes and Forbes when he officially opened the Vintage Village. Photographs showing him emulating the famous engine-driving Prime Minister, the late Ben Chifley, were given national prominence in the press.

The Village's collection also includes the last Garratt to go out of service in New South Wales — the same Garratt which hauled the last scheduled steam-hauled service in New South Wales. "Old 1919" was the last steam locomotive to run officially in the Sydney metropolitan area, last working at Darling Harbour. At one stage she worked on the Oberon branch line.

The standard-gauge equipment is part of a total "Steam Theme" presented by the Vintage Village.

As part of the project's internal transport system, within the 200 acres of its exhibition area, a two-foot gauge steam railway is operated, utilising former cane-train locomotives.

Part of the activated museum is the Rosebank steam-powered blacksmith's shop and engineering works, the steam-powered sawmill, the steam-powered gold ore stamping battery, and the steam roller used for exhibition purposes.

An old Cornish boiler from the Britannia gold mine is still on the Village site, recalling the days in 1861-62 when 30,000 miners swarmed to the fabulously wealthy South Lead of the Lachlan Goldfield. This lead passes through the Village site.

The original miners extracted 300,000 ounces of alluvial gold from the field in its first two years. At today's values, that gold would be worth $50 million.

The "new rush" to the Lachland diggings comprises tourists, 200,000 of whom have visited the activated museum since its opening, three years ago.

The State and Federal Governments have provided finance for the project, with very substantial loan funds contributed by the Forbes Municipal and Jemalong Shire Councils. State Government help is continuing this year, with a $35,000 advertising and promotion grant from the N.S.W. Department of Tourism.

As well as significantly aiding advertising of the tourist project, the funds made possible the completion on site of an audio-electronic system which can be activated by visitors, and provides a taped commentary in ten of the fifty features on site.

Actor and television personality, Noel Ferrier, provides the narration on the tapes, giving background detail on the pioneer buildings which are reproductions of the homes of the goldminers who made the Forbes strike — such men as Ben Hall of bushranger fame, the family O'Meally whose most infamous son was a bushranger, and Henry Lawson, of poetical fame. There are also service buildings such as the whim house, and even that of Toller, the undertaker.

The audio-electronic system is due for official commissioning in July this year.

Restoration of Perth's City Railway Station

Forecourt to Perth City Station

Perth's city railway station, which has been listed for preservation by the National Trust, is to be restored. Commissioner for Railways, Mr R. J. Pascoe, recently announced plans for the re-development of the station area at an estimated cost of $850,000. The first stage is planned for completion in readiness for the State's 1979 Sesqui-Centenary celebrations.

Plans for the building include restoration of the station to a state similar to that which it presented to travellers at the turn of the century.

A major feature is the current construction of an open pedestrian walkway linking the MTT's bus terminal with the railway station forecourt and Wellington Street under the Horseshoe Bridge.

The original archecture of both City Station and Horseshoe Bridge is to be maintained, and platforms are to be upgraded together with installation of improved public information equipment.

It is proposed to re-model the undercroft of the Horseshoe Bridge as a Western Australian centre for industry and design in conjunction with the Department of Industrial Development. There are also plans for an attractive tavern and coffee house in the overall scheme.

Reconstruction is proposed for the central ground-floor area of City Station as an open arcade with small shops and new ticket facilities for travellers. The station forecourt is to be re-modelled with an open public plaza, complete with gardens, and eliminating car parking in the vicinity.

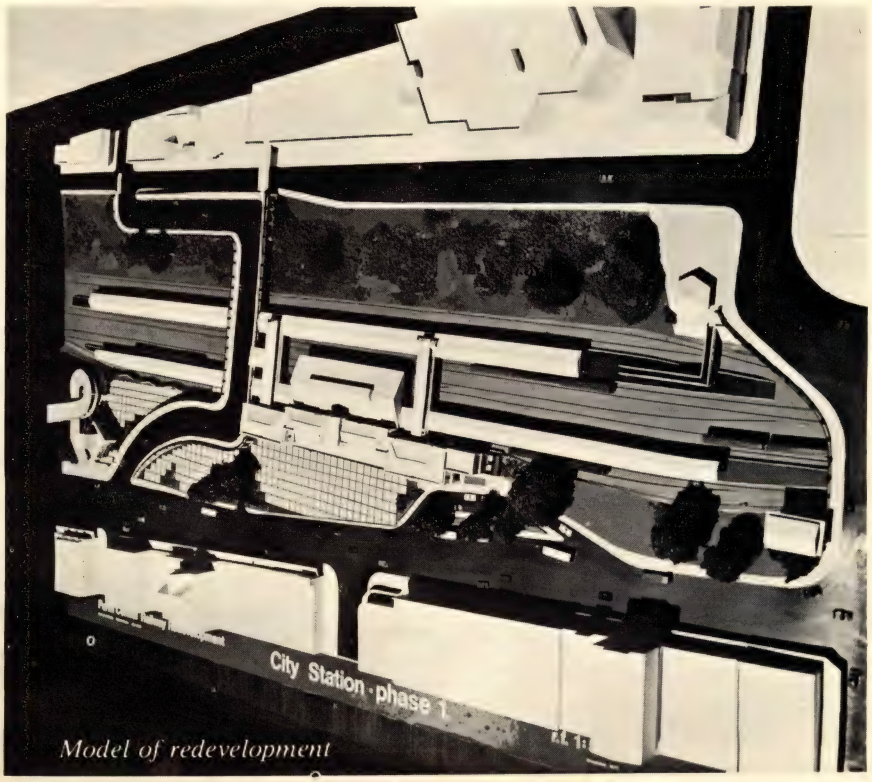
There will be several changes to railway offices and facilities including the re-siting of Perth Parcels Depot from July 3 under the northern undercroft of the Horseshoe Bridge, allowing release of land in Roe Street for planned road widening. Redundant railway tracks are also to be removed and the property landscaped.

The Commissioner said that plans to tidy up the City Station area in time for the 1979 celebrations and to transfer part of the present function of Perth Parcels depot to Kewdale went hand-in-hand with the future development of Roe Street and construction of the new Cultural Centre. "The present buildings in Roe Street are old and must be removed to allow development to continue. However, a reception point will be retained for parcels under the Horseshoe Bridge, with certain limitations."

Mr Pascoe said that, from July 3, Perth Parcels Depot would act only as a despatch centre for pre-paid parcels with a weight limit of 20 kg each and with a restriction of six parcels to each person. From July 3 all inward consignments and COD parcels will be handled at Kewdale **Freight Terminal.**

Old timber sheds to the north of City Station will also be removed and carriage cleaning transferred to a new site at Claisebrook.

In the long term the objective is to completely re-design the City Station area in association with the proposed Forrest Place-Padbury Building-Australia Post re-development project. This project will involve railway track and signalling re-alignment, new platforms and pedestrian over-bridges, decking over section of the railway leading to the Cultural Centre and development of pedestrian spines between City Arcade and the Cultural Centre and Perth City Council's proposed Roe Street Car **park.**



Model of redevelopment

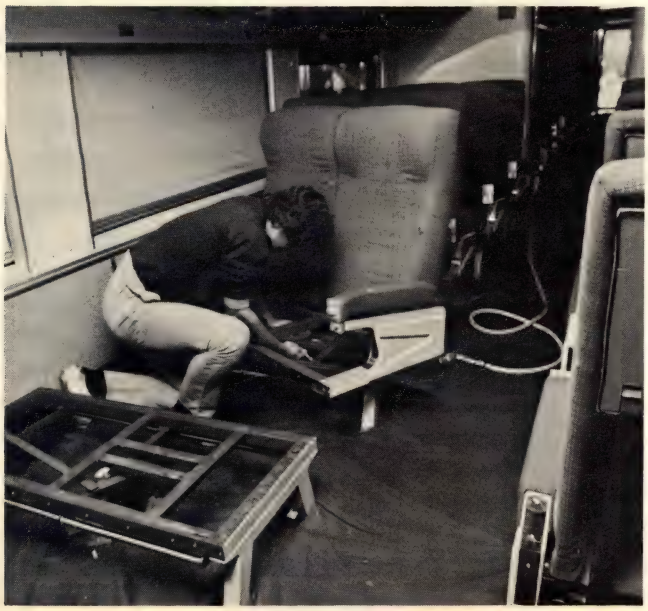
Overhaul Programme for "Prospector"

Since its introduction in November 1971, "Prospector" has run many millions of kilometres operating to a regular schedule between Perth and Kalgoorlie. In the main, it has not missed a beat and, except for general cleaning and maintenance, "Prospector" has not been completely overhauled since its first day in service over six years ago.

An overhaul programme has now been set and the first railcar to leave Midland Workshops after refurbishing has been returned to regular service. The remaining seven cars are entering the workshops progressively.

The new interior decor maintains a corporate colour theme throughout, with a charcoal-brown carpet on the floor and grey carpeting part-way up the side walls and over the baggage rack. Seats have been recovered in blue material. The same colour has been carried through to the galley curtains. The side curtains at each window are orange.

The air-conditioning system on all cars is to be completely overhauled, together with electrical wiring, controls and refrigeration in the galley. The bogies and diesel generating sets on trailers and the engines on all power cars are programmed for complete overhaul.



Westrail

The first line of concrete sleepers being manufactured at Meckering for the Kwinana-Koolyanobbing standard-gauge project. A total of 960,000 sleepers are to be produced during the five-year rehabilitation programme.

The Window Seat

The "Eastern Explorer Rail Pass", available in Australia to all travellers on 1 July, provides 21 days first-class rail travel, including reserved seats, for only $150. Patrons using the Pass can travel as far north as Brisbane in Queensland, as far west as Port Pirie in South Australia, and anywhere in New South Wales or Victoria.

The "Eastern Explorer Rail Pass" includes interstate and intrastate travel, as well as travel throughout the metropolitan areas of Brisbane, Melbourne and Sydney. It also applies to road coach services owned or operated by Government-owned railways.

Rail travellers using the Pass will be able to travel on several of Australia's internationally recognised trains such as the "Indian-Pacific", "Southern Aurora", "Brisbane Limited" and "The Overland".

The "Eastern Explorer Rail Pass" is available between 1 July and 30 November 1978.

ANR has called tenders for the manufacture of a further 70,000 steel sleepers for a 45 km section of rail track in Central Java, Indonesia. ANR control an aid programme to the Indonesian Railways on behalf of the Australian Development Assistance Bureau as part of the Federal Government's Colombo Plan aid. Steel sleepers are used widely by Indonesian Railways due to a shortage of suitable local timbers and problems that prevail in Indonesia in relation to concrete sleepers.

* * *

Following a marked upturn in northbound freight traffic in recent weeks, ANR has resumed all scheduled freight train services on the Central Australia Railway and believes much of the new traffic has been won from road hauliers. The re-commencement of prime frozen-beef movements from the Alice Springs abattoir has bolstered southbound freight movements. ANR has recently constructed a 400-metre spur line to the abattoirs which has greatly facilitated easier handling of meat stocks onto ANR refrigerated containers.

* * *

VicRail Chairman, Mr A. G. Gibbs has announced that the programme to upgrade suburban rolling stock is not coming to an end despite the fact that delivery of VicRail's first order of 50 silver trains is nearing completion.

Government approval, he said, has already been given for the expenditure of $20 million to extend the existing order to include an additional 54 motor carriages, the equivalent of 9 extra trains. These will ensure a continuance of supply of silver trains pending deliveries under a contract for a further 50 new trains, tenders for which are presently being examined, and which will cost in the order of $96 million.

In addition to providing additional modern rolling stock, the 54 extra motor carriages will be "updated" to have the same acceleration rate and carriage arrangements as those in the tender presently being examined. These 54 motor carriages, those in the new 50-train order, as well as the carriages of existing silver trains, will be so marshalled as to provide trains of two balanced units of three cars each. This arrangement will facilitate operation of the Underground Loop, the proposal being to run trains anti-clockwise in the morning and in the reverse direction in the afternoon, the better to cope with passenger flow.

* * *

Electrification of the PTC's Illawarra line between Sutherland and Waterfall will be completed by April 1980 at a cost of about $5 million. More than $29,000 has been spent on the photogrammetry survey of the line as a prelude to major contstruction work. About $470,000 will have been spent on the first stage of the project by the end of June.

The overall project will involve design, surveys, extension of Loftus station platform, the provision of new substations, overhead wiring structures and catenary wires, signalling relays and cables.

When this section of track is electrified, the PTC's electric trains will be able to operate over a 460 kilometre route network which extends north to Gosford, west to Lithgow, south to Campbelltown and, on the busy Illawarra line, to Waterfall.

* * *

Special "packs" have been prepared by the Public Transport Commission for issue to school principals and teachers publicising PTC "Educational School Tours".

The brochures included in the kit outline the many tours specially prepared for school children of all ages, including six Camping Tours to Queensland and Victoria run by the PTC in conjunction with Greyhound Coaches.

Members of the Commission's Educational Tours Section regularly visit schools to distribute the publicity material and to promote tours. Last year, over 30,000 school children travelled on special tours arranged by the PTC.

* * *

Acting Minister of Railways in New Zealand, Mr McCready, has announced that a further ten new diesel locomotives have been ordered for main line freight trains on New Zealand Railways.

Ten 1500 hp locomotives were ordered late last year from General Motors, Canada, and that contract has now been extended taking the value of the order, including spares to over $16m. The first of the new locomotives, to be classified as Df, are expected to arrive in New Zealand early in 1979.

Dr D. G. (Don) Stevenson has been appointed Director of Westrail's Management Services Bureau following the appointment of the former Director, Dr P.R. Grimwood, to Australian Railway Research and Development Organisation as its Executive Director.

Dr Stevenson joined Westrail in September 1975 as the first Manager of the Services Division in the Management Services Bureau. He established a Cost Research Section forming a new team for investigation cost structures.

Next he recruited a group of research specialists to develop mathematical models of Westrail operations, in particular the utilisation of rollingstock, establishing some of the newest management techniques in Westrail.

Before coming to Westrail, Dr Stevenson worked in the petrochemical industry in Scotland. As Superintendent of Operational Research for BP Chemicals International he was responsible for developing many new scientific management approaches.

Besides developing mathematical models and computer systems for Corporate Planning in BP he was also responsible for developing new maintenance scheduling systems.

These were so successful in reducing maintenance costs that they were widely used in other parts of the BP organisation in Europe and the Middle East.

He was also concerned with data processing applications for control of maintenance stores, payroll, and payment of creditors.

Dr Stevenson took a first-class honours degree and an MSc in physics from Adelaide University before going to the University of London to take his PhD in electrical engineering.

He worked in the field of nuclear engineering before going to ICI to work on research and development.

Dr Stevenson has been Secretary of the Perth Chapter of the Australian Society of Operations Research and the Operational Research Group of Scotland. He is a fellow of the Physical Society, an affiliate of the British Computer Society and a member of the Institute of Measurement and Control.

* * *

Extensions are currently being planned for Westrail's Chief Mechanical Engineer's office block at Midland. The single-storey section on the western end of the building, constructed during the mid-1960's, will be fitted with an upper floor using a prefabricated lightweight cladding material. The new floor, of 600 square metres, will house a library and drawing office.

* * *

At Forrestfield Marshalling Yards, a two-building complex to house the Signal and Telecommunication Technical Services and District Electrical Supervisor is well under way. The District Electrical Workshop, incorporating workshop/store facilities, depot for a Safe Working Technician and general offices, will be completed early in the 1978 financial year. The Technical Service Centre, however, will not be finished until September.

* * *

Mr A. R. Hamilton of the PTC's Electrical Branch has been appointed Project Manager, Sutherland/Waterfall Electrification — a $5 million project scheduled for completion by April 1980.

Mr Hamilton will be responsible to the Director of Capital Works Programmes and Projects for the planning, design and implementation of the installation.

* * *

Westrail's educational one-day tours for 1978 have been highly successful to date. Seventy four tours have been reserved by both primary and secondary schools involving 3496 students. They include visits to Alcoa's alumina refinery at Pinjarra, to Fairbridge Farm School, and to Dwellingup for timber milling and orchard management. Another one-day tour embraces the Mundaring, York and Toodyay region, visiting areas of historical interest.

Extended three- and four-day tours cover the goldfields, visiting the Golden Mile, old Coolgardie and adjacent "ghost" towns, and the nickel industry at Kambalda. South-west tours, over three days, cover coal-mining at Collie, Bunbury and its harbour, sand-mining at Capel, and forest areas at Ludlow.

Following last year's successful introduction of 14-day Indian Pacific holiday tours to Sydney and Canberra, a further nine tours are operating this year. These have been diversified to include new itineraries to Queensland and a combined 20-day tour covering both New South Wales and Queensland.

Another new 16-day round tour accommodating 40 passengers, embracing Adelaide, Melbourne and Sydney will leave Perth on November 22. This tour will cover the Barossa and Hunter Valleys in South Australia, a "Puffing Billy" steam-train excursion to the Dandenongs and a visit to Sovereign Hill, Ballarat in Victoria, and the Hawkesbury River and the south coast in New South Wales.

* * *

A contract has been let by the Public Transport Commission of N.S.W. to A. Goninan & Co. Ltd for ten "side-tipping" wagons which will be the first of their type to be used by the PTC and are believed to be the first acquired by any Government-owned railway system in Australia.

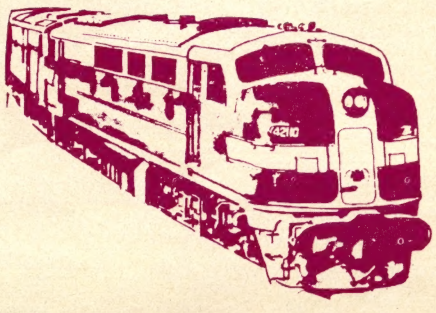
These specialised wagons will be used by the Way and Works Branch on track upgrading work in conjunction with ballast-cleaning operations. They will receive rejected material direct from the ballast cleaners and, by use of special pneumatic equipment, loads can be discharged at suitable locations from either side.

In the $200 million track-upgrading programme to date the Commission has used similar wagons obtained on loan from Australian Iron & Steel.

First of the PTC's new wagons is expected in late July 1978.

* * *

In the year ending 30 September 1977, which included disruptions caused by severe winter weather, Amtrak carred a record total of more than 19 million passengers, a 5.8 per cent increase on the previous year.



Tenders and Contracts

Recent Contracts include:

ANR — 50,000 timber sleepers: G.L. & M.D. Campbell ($370,000).

ANR — Manufacture, supply and delivery of 24 passenger-car bogies: Bradford Kendall Foundries Pty Ltd ($352,512).

ANR — Fitting road-rail conversion kits to 5 Daihatsu S60V55 wide vans: Freighter Industries Ltd, Launceston ($17,375).

QR — Design, manufacture and delivery of 12 91.8 tonne diesel electric locomotives: Clyde Engineering (Q'land) Pty Ltd ($9,522,312).

QR — Construction of railway bridge over the MacKenzie River: A.H. Hodge Constructions Pty Ltd ($1,924,788).

QR — Construction of a CMR servicing and washdown shed, Mayne: J.P. Cordukes Pty Ltd ($489,983).

QR — Supply of 20,000 cubic metres prepared stone railway ballast, delivered into rail wagons at Nightjar Railway Station: Farley & Lewers (Q'land) Pty Ltd ($139,000).

QR — Supply and delivery of sleeper renewing machines: Comeng-Aresco Pty Ltd ($59,998); George Moss Pty Ltd ($51,536)

QR — Design, supply, installation and commissioning, automatic electronic wagon weighbridge at Norwich Park: Evans Deakin Industries Ltd ($130,450),

QR — Supply and delivery of 400 solid steel wheels: Commonwealth Steel Co. Ltd ($107,200).

VR — Manufacture, supply and delivery of Cotton-polyester corespun duck: Bradmill Textiles Pty Ltd ($354,393).

VR — Manufacture, supply and delivery of electro-pneumatic train stop mechanisms: Westinghouse Brake & Signal Co. (Aust) Pty Ltd ($208,600).

VR — Carriage of passengers and parcels between Bendigo railway station and Ultima railway station: Calder Highway Coach Service Pty Ltd ($168,690).

VR — Assembly, wiring, supply and delivery of geographical relay modules for signal interlockings: Email Ltd, Relays Division ($117,370).

WAGR — Preservation Treatment of Sleepers: Koppers Australia Pty Ltd ($100,640).

CP Rail expects to spend $163 million on new track, equipment and shop facilities across Canada in 1978. Last year, it spent $131 million on facilities and equipment.

Purchase of motive power, rolling stock and maintenance equipment will account for $40 million, $35 million will be spent to install 300 miles of new track on the main line, and $4 million to relay 114 miles of track and siding with reuseable rail removed from other locations.

The construction programme will provide employment during the summer months for approximately 450 men in the Pacific region, 550 men on the Prairies, 400 in Ontario and 200 in Quebec and the Maritimes.

Another major expenditure — approximately $22 million — will replace 1.7 million of the company's near 70 million ties. Another $4 million will be spent to lay new ballast on approximately 650 miles of rail line.

Construction of bridges and culverts will cost $6.5 million while double-tracking projects in the mountains of British Columbia will account for another $10 million. The rest of the programme is for shop construction, machinery and equipment acquisitions, yard upgrading, siding construction, safety equipment, and signal systems.

(See also p. 10)

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